Amendments to the Drawings:

The attached sheets of drawings includes changes to Figs. 3, 4, and 13. These sheets, which include Figs. 3, 4, and 13, replace the original sheets including Figs. 3, 4, and 13.

Attachment: Replacement Sheets
Annotated Sheets Showing Changes

REMARKS/ARGUMENTS

Claims 1, 2, 5, 6, 8-16, 18, 19, and 23-27 are pending. Claims 3, 4, 7, 17, and 20-23 are canceled. Claims 1, 2, 5, 6, 8, 9, 11-16, 18, and 19 have been amended. New claims 23-27 have been added. The specification and drawings have also been amended to correct minor informalities. No new matter has been introduced. Applicants believe the claims comply with 35 U.S.C. § 112.

Claim 11 as amended recites that a track width of the magnetoresistive stack layer differs non-continuously. A discontinuity of track width within the antiferromagnetic layer 4 is illustrated, for instance, in Fig. 1. The problem of orientation change between the bias layer and the magnetoresistive stack layer due to the discontinuity is discussed in the Background of the Invention.

Section 102 Rejections

Claims 1, 2, 5, 8, 10-12, 15, 18, and 20 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Lin et al. (US 6,876,525).

Claims 1, 2, 5, 6, 8-12, 15, 16, 18, and 29 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Ooshima (US 6,888,706).

Claims 1, 2, 5, 8, 10-15, and 18 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Aoki et al. (JP 2002-151755).

Applicants respectfully submit that independent claim 1 as amended is novel and patentable over Lin et al., Ooshima, and Aoki et al., because they do not teach or suggest that the second underlayer, which is formed below the magnetic domain control film, is formed of Cr or Cr alloy and comprises a body-centered cubic lattice (BCC) polycrystal thin film, and polycrystal orientation of the second underlayer against a formed plane thereof is isometric random crystal orientation having no particular crystal orientation.

Lin et al. discloses a longitudinal bias (LB) stack including separation, seed, and LB layers. According to the disclosure in Lin et al., the separation layer, preferably made of an amorphous film, separates the pinning layer from the seed and LB layers and thereby prevents unwanted crystalline effects of the pinning layer. The nonmagnetic seed layer

exhibits a body-centered-cubic (bcc) structure, but the seed layer's closest packed (110) crystalline planes lie in the film surface (see col. 5, lines 53-55). This is because the Cr seed film grows freely on the amorphous film poly and the hard-magnetic LB layer exhibits a hexagonal-centered-cubic (hcp) structure (see col. 5, lines 51-53).

In the present invention, the polycrystal orientation of the second underlayer, the layer formed below the magnetic domain control film, is isometric random crystal orientation having no particular crystal orientation. The inventors have found problems of deterioration of magnetic property when the crystal orientation of the magnetoresistive stack layer and the magnetic domain control film do not match. To solve this problem, the present invention forms an amorphous metal film layer and an underlayer having no particular crystal orientation below the magnetic domain control layer. This feature is not taught or suggested in Lin et al.

Ooshima discloses a bias underlayer and bias layer formed on an amorphous conductive layer. The bias underlayer, however, has a bcc crystal structure with a preferential orientation of at least a [211] or [200] face in the direction perpendicular to the layer surface (see col. 6, lines 19-21). This is different from the claimed invention.

Aoki et al. discloses bottom raising layers 32, bias base layers 33, and hard bias layers 34, but it does not teach that the bottom raising layer 32 is amorphous and that the bias layer has no particular crystal orientation. According to the disclosure in Aoki et al., the bottom raising layer 32 is preferred to have bcc structured metal film, such as metal film of one or more elements from Cr, W, Mo, V, Mn, Nb, Ta (see [0044]). It could also be formed of an insulated material. The bias base layers are preferred to be formed of bcc structured metal film, such as metal film of one or more elements from Cr, W, Mo, V, Mn, Nb, Ta (see [0045]). Thus, Aoki et al. does not anticipate or render obvious the claimed invention.

For at least the foregoing reasons, claim 1 and claims 2, 5, 6, and 8-10 depending therefrom, are novel and patentable over Lin et al., Ooshima, and Aoki et al.

Applicants respectfully submit that independent claim 11 as amended is novel and patentable over Lin et al., Ooshima, and Aoki et al., because they do not teach or suggest that the second underlayer, which is formed below the magnetic domain control film, is formed of Cr or Cr alloy and a polycrystal orientation of the second underlay against a

formed plane thereof is isometric random crystal orientation having no particular crystal orientation.

As discussed above, Lin et al. discloses a longitudinal bias (LB) stack including separation, seed, and LB layers, but fails to teach or suggest a second underlayer formed below the magnetic domain control film and having isometric random crystal orientation with no particular crystal orientation. Ooshima discloses a bias underlayer and bias layer formed on an amorphous conductive layer, but the bias underlayer has a bcc crystal structure with a preferential orientation of at least a [211] or [200] face in the direction perpendicular to the layer surface. Aoki et al. discloses bottom raising layers 32, bias base layers 33, and hard bias layers 34, but it does not teach that the bottom raising layer 32 is amorphous and that the bias layer has no particular crystal orientation.

For at least the foregoing reasons, claim 11, and claims 12-16, 18, and 19 depending therefrom, are novel and patentable over Lin et al., Ooshima, and Aoki et al.

Section 103 Rejections

Claims 13 and 14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ooshima.

Claims 13 and 14 depend from claim 11, and are submitted to be patentable as being directed to additional features of the invention, as well as by being dependent from allowable claim 11 for the reasons discussed above.

New Dependent Claims 23-27

New claims 23-27 depend from claim 11, and recite additional features not taught or suggested in the references. For example, claim 23 recites that the magnetic domain control film is formed of a Co alloy film, the second underlayer is formed of a Cr or Cr alloy film, and the amorphous metal film layer is formed of an Ni series alloy or Co series alloy film and includes at least one element selected from the group consisting of P, Cr, Zr, Nb, Hf, In, Mo Ti, V, Ta, W, Ru, Rh, Pd, and Pt. Claim 24 recites that a surface of the amorphous metal film layer is oxidized. Claim 26 recites that the magnetic domain control film comprises a magnetic thin film formed of a Co alloy film and containing 5 to 20 at% composition of Pt element as a first addition element, with a coercivity of the magnetic

domain control film of 1 KOe or more and with a saturation magnetic flux density of 1 T or more. These additional features further distinguish the claimed invention over the cited art.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,

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Attachments
RL:rl
60702506 v1

Annotated Sheet Showing Changes

FIG.3 (PRIOR ART)

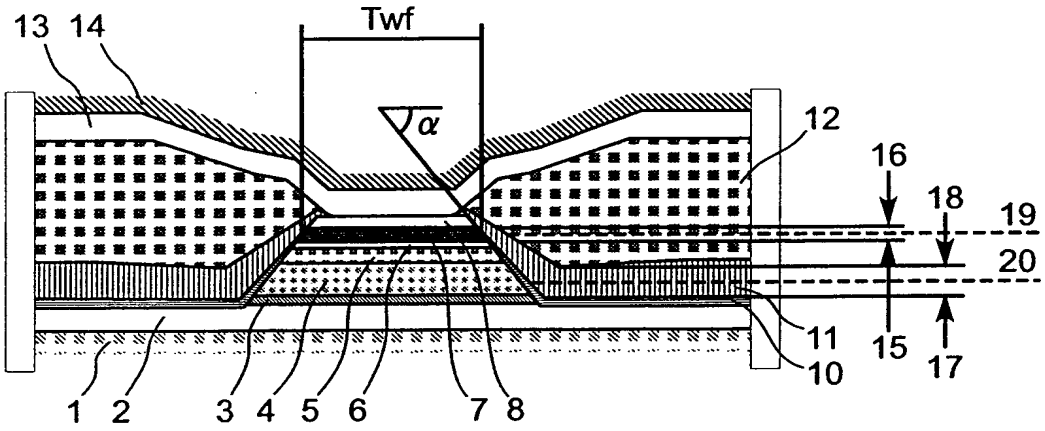

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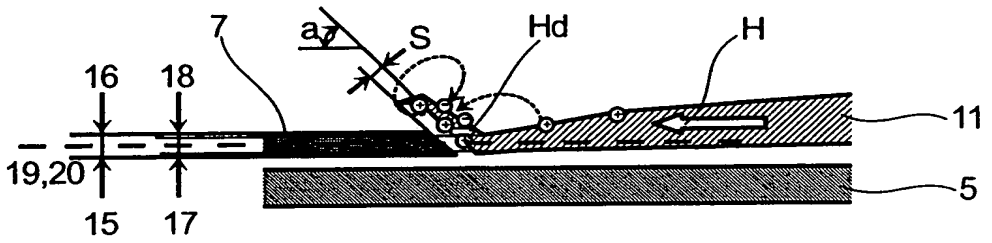
FIG.4

(a)



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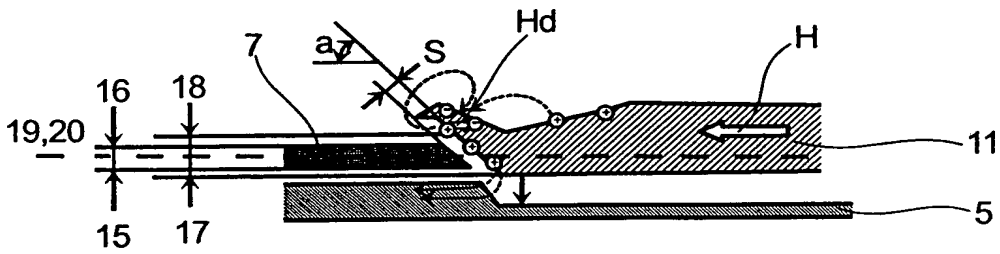
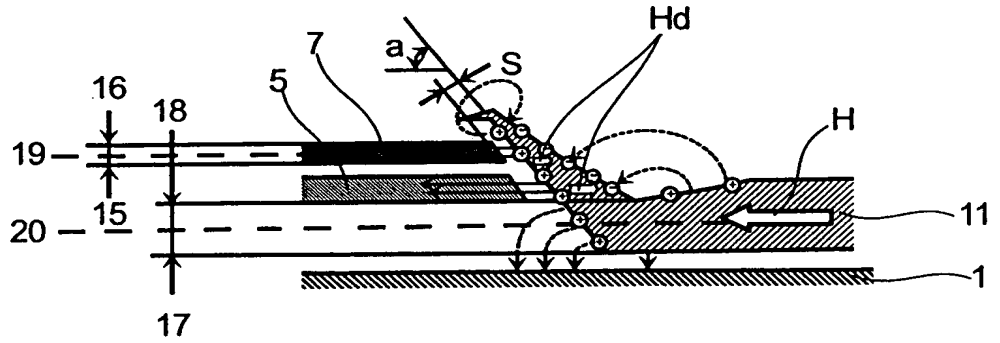


(c) (PRIOR ART)



Annotated Sheet Showing Changes

FIG.13